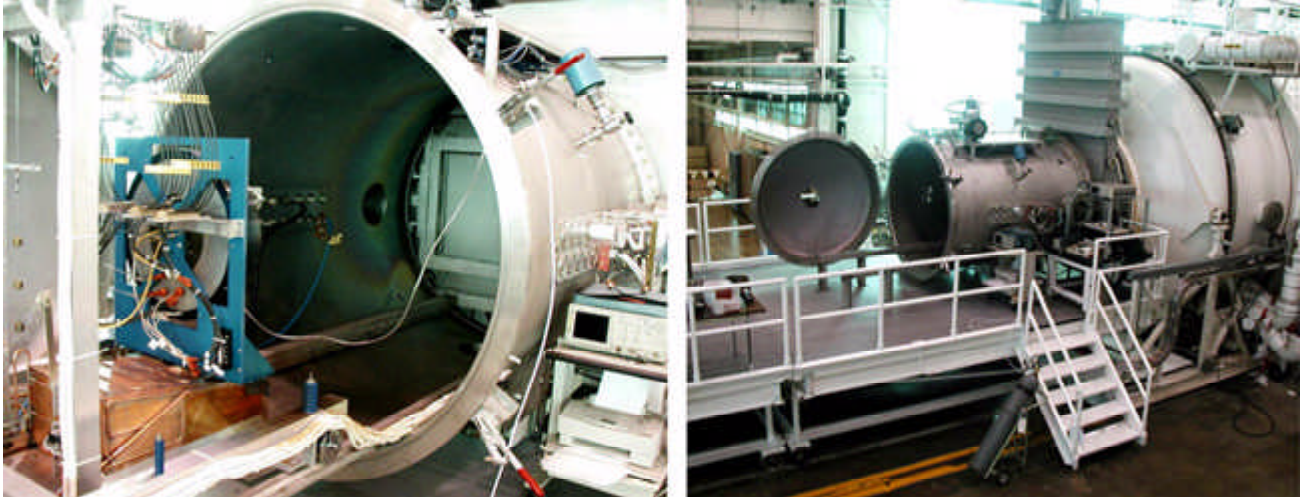


6-ft High-Power Electric Propulsion Test Port, EPL Tank 5 Installed



Left: 50-kW Hall thruster and thrust stand on rail system. Right: 6-ft test section and platform.

High-power electric propulsion is a critical component of NASA's proposed missions to the outer planets. Mission studies have shown that high-power, high-specific-impulse propulsion systems can deliver 2000 kg of scientific payload to Pluto with trip times on the order of 10 years. Of greater significance is the ability of these propulsion systems to place this science payload in orbit around the planet, rather than making the fast fly-bys associated with traditional chemical propulsion systems. Significant ground test programs are required to develop the new technologies needed for thrusters operating at power levels exceeding 20 kW, an order of magnitude above the state of the art.

High-power electric propulsion research capability has been a hallmark of the NASA Glenn Research Center's Vacuum Facility 5 (VF5) facility for many years. VF5 has adequate pumping speed, power, and diagnostic systems to conduct thruster tests at power levels in excess of 100 kW. These tests were traditionally conducted in the main body of the tank, so the vacuum systems had to be cycled when test hardware needed to be modified or changed out.

This year, a 6-ft bell-jar port was added to consolidate the existing high-power electric propulsion test capabilities of VF5, allowing the test article to be installed in an isolated chamber. This operational change will significantly improve test efficiency and reduce costs by allowing changes in the test configuration without cycling the main body of the tank to atmospheric pressure. The port features a molecular turbopump that can pump down the tank independent of the test facility, and a rail system for installing the thruster and thrust stand. The auxiliary power, data, video, and thrust measurement systems are consolidated in permanent racks on the platform extension. A successful 50-kW Hall thruster test has been completed in the port with nominal facility performance.

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